**Log Event** A

**Borehole** # 21-02-01

## Borehole Information

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|---|---|---|
| **Farm :** BX | **Tank :** BX-102 | **Site Number :** 299-E33-129 |
| **N-Coord :** 45,530 | **W-Coord :** 53,219 | **TOC Elevation :** 655.18 |
| **Water Level, ft :** | **Date Drilled :** 4/30/1970 | |

### Casing Record

| | | |
|---|---|---|
| Type : Steel-welded | Thickness : 0.280 | ID, in. : 6 |
| Top Depth, ft. : 0 | Bottom Depth, ft. : 101 | |

**Borehole Notes:**
According to the driller's log, this borehole was drilled in April 1970 to a depth of 100 ft using 6-in. casing. The drilling report does not indicate the borehole casing was perforated or grouted. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The top of the casing, which is the zero reference for the SGLS, is approximately 0.5 ft below the ground surface.

## Equipment Information

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|---|---|---|
| **Logging System :** 2 | **Detector Type :** HPGe | **Detector Efficiency:** 35.0 % |
| **Calibration Date :** 04/1997 | **Calibration Reference :** GJO-HAN-13 | **Logging Procedure :** P-GJPO-1783 |

## Log Run Information

| | | |
|---|---|---|
| **Log Run Number :** 1 | **Log Run Date :** 05/09/1997 | **Logging Engineer:** Bob Spatz |
| **Start Depth, ft.:** 100.5 | **Counting Time, sec.:** 100 | **L/R :** L **Shield :** N |
| **Finish Depth, ft. :** 36.0 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a |

| | | |
|---|---|---|
| **Log Run Number :** 2 | **Log Run Date :** 05/12/1997 | **Logging Engineer:** Bob Spatz |
| **Start Depth, ft.:** 37.0 | **Counting Time, sec.:** 100 | **L/R :** L **Shield :** N |
| **Finish Depth, ft. :** 0.0 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a |

| | | |
|---|---|---|
| **Log Run Number :** 3 | **Log Run Date :** 05/12/1997 | **Logging Engineer:** Bob Spatz |
| **Start Depth, ft.:** 5.0 | **Counting Time, sec.:** 100 | **L/R :** L **Shield :** N |
| **Finish Depth, ft. :** 22.0 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a |

**Borehole** 21-02-01

**Log Event** A

## Analysis Information

Analyst : S.D. Barry

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 07/08/1997

**Analysis Notes :**

This borehole was logged by the SGLS in three log runs, including a section that was relogged for quality assurance purposes. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The only man-made radionuclide detected in this borehole was Cs-137. The presence of Cs-137 was measured almost continuously from the ground surface to a depth of 41 ft. Alternating zones of intermittent and continuous Cs-137 contamination were detected from 41.5 ft to the bottom of the logged interval (100.5 ft).

The K-40 concentrations increase at about 41 ft. It was not possible to identify many of the 609-keV peaks used to derive the U-238 concentrations between 4 and 10 ft. This occurred because high gamma-ray activity associated with the nearby Cs-137 peak (661 keV) created an elevated Compton continuum extending to the 609-keV region, causing the MDL to exceed the measured U-238 concentration.

The interval between 5 and 22 ft was relogged as a quality assurance measure. The concentration values of both log runs for Cs-137 and the natural radionuclides were plotted. The calculated concentration values were well within the statistical error range and showed the excellent repeatability of the system.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank BX-102.

**Log Plot Notes:**

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A rerun plot was generated for the region between 5 and 22 ft. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.